ABSTRACT

This is a high torque power, reciprocating engine. It is interchangeable between a 2-stroke and a 4-stroke by easily repositioning an idler gear. The combustion cylinder is sized to get the most complete combustion for high fuel efficiency and reduced exhaust emissions.

Power is transmitted between the piston and shaft through a rugged, efficient 1-way clutch, which is also described. Each piston in a pair is offset from the shaft's axis by the radius of its 1-way clutch, which causes instant peak torque at the beginning of the power stroke. The drive races of the pair of 1-way clutches engage opposite sides of the idler, whereby synchronous reverse motion is transmitted to the second piston in the pair as the inner race transmits power to the shaft. Selectively deactivated pairs of pistons are motionless in their cylinders without putting load on the shaft because of the 1-way clutch's overrun feature.

In a 2-stroke, there is power stroke overlap with two or more pairs of pistons. In a 4-stroke, there is power stroke overlap between two or more banks with two pairs in each bank. An engine computer synchronizes operation between the pairs and the banks.